

## RADIO FREQUENCY EMISSIONS ANALYSIS REPORT

### T-Mobile Proposed Facility

Site ID: CT11002A

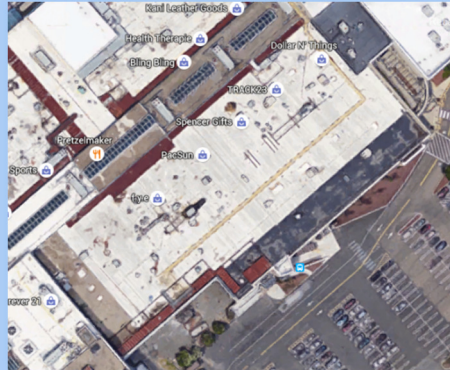


Milford / I-95 /Rt. 1

1201 Boston Post Road, Milford, Connecticut 06460

**March 8, 2016**

EBI Project Number:

6216001365

<b>Status:</b>	<b>Compliant</b>	
<b>Recommended Signage</b>		
<b>Sign Count</b>	<b>Sign Type</b>	
<b>2</b>		
<b>2</b>		
<b>Remarks:</b> See attached signage plan. No additional mitigation is required.		

March 8, 2016

Attn: Dan West  
35 Griffin Road  
Bloomfield, CT 06002

Emissions Values for Site: CT11002A

Maximum Composite Emissions Value: **56.2000%** of the FCC's general public limit (**11.24%** of the FCC's occupational limit). The **Proposed** site is in compliance with Federal regulations regarding (radio frequency) RF Emissions.

EBI Consulting was directed to analyze the Proposed T-Mobile rooftop facility located at 1201 Boston Post Road in Milford, Connecticut for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits. This report contains a detailed summary of the RF EME analysis for the site.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limit for the 700 and 800 MHz Bands is 467  $\mu\text{W}/\text{cm}^2$  and 567  $\mu\text{W}/\text{cm}^2$  respectively, and the general population exposure limit for the PCS and AWS bands is 1000  $\mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were done for the Proposed T-Mobile Wireless antenna rooftop facility located at 1201 Boston Post Road in Milford, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed a distance above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of in areas in the immediate vicinity of the antennas.

For all calculations, equipment was calculated using the following assumptions:

- 1) 2 GSM / UMTS channels (PCS Band – 1950 MHz) were considered for each sector of the Proposed installation. The transmit power for these channels is 30 watts per channel.
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the Proposed installation. The transmit power for these channels is 30 watts per channel.
- 3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the Proposed installation. The transmit power for these channels is 60 watts per channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the Proposed installation. The transmit power for this channel is 30 watts.
- 5) All radios at the Proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the Proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 6) EBI has performed theoretical worst case modeling using Roofview® to estimate the maximum potential power density from each antenna based on worst-case assumptions for the number of antennas and power.
- 7) The Data for all T-Mobile antennas used in this analysis is shown below in Table I. Actual antenna gains for each antenna were used per manufacturer's specifications.

8) There are no additional carriers located on this facility.

All calculations were done with respect to uncontrolled / general public threshold limits.

### T-Mobile Site Inventory and Power Values

Antenna Number	Sector	Antenna Make	Antenna Model	Height (ft) Above Nearest Walking Surface	Frequency Band	Technology	Power Per Channel	ERP (W)	Azimuth	Number of Channels
1	A	Ericsson	AIR21 B2A/B4P	15.7	PCS - 1950 MHz	GSM/UMTS	30	2057	75	2
1	A	Ericsson	AIR21 B2A/B4P	15.7	AWS - 2100 MHz	UMTS	30	2057	75	2
2	A	Ericsson	AIR 21 B4A/B12-B5P	12.4	AWS - 2100 MHz	LTE	60	3267	75	2
2	A	Ericsson	AIR 21 B4A/B12-B5P	12.4	700 MHz	LTE	30	700	75	1
1	B	Ericsson	AIR21 B2A/B4P	15.7	PCS - 1950 MHz	GSM/UMTS	30	2057	190	2
1	B	Ericsson	AIR21 B2A/B4P	15.7	AWS - 2100 MHz	UMTS	30	2057	190	2
2	B	Ericsson	AIR 21 B4A/B12-B5P	12.4	AWS - 2100 MHz	LTE	60	3267	190	2
2	B	Ericsson	AIR 21 B4A/B12-B5P	12.4	700 MHz	LTE	30	700	190	1
1	C	Ericsson	AIR21 B2A/B4P	15.7	PCS - 1950 MHz	GSM/UMTS	30	2057	320	2
1	C	Ericsson	AIR21 B2A/B4P	15.7	AWS - 2100 MHz	UMTS	30	2057	320	2
2	C	Ericsson	AIR 21 B4A/B12-B5P	12.4	AWS - 2100 MHz	LTE	60	3267	320	2
2	C	Ericsson	AIR 21 B4A/B12-B5P	12.4	700 MHz	LTE	30	700	320	1
1	D	Ericsson	AIR 21 B4A/B12-B5P	11.7	AWS - 2100 MHz	LTE	60	3267	250	2
1	D	Ericsson	AIR 21 B4A/B12-B5P	11.7	700 MHz	LTE	30	700	250	1

Table 1: T-Mobile Site Inventory and Power Value

Additional Carriers Located on Site	
Carrier	MPE %
	No additional carriers are located onsite.

Table 2: Additional Carrier Inventory and Emissions Levels

## Summary

All calculations performed for this analysis yielded results that were within the allowable limits for exposure to RF Emissions. Based on predictive modeling, there are no modeled exposures on any accessible main roof level-level walking/working surface related to T-Mobile's equipment in the area that exceed the FCC's occupational and/or general public exposure limits at this site. T-Mobile can bring this site into compliance by posting the recommended signage per this report.

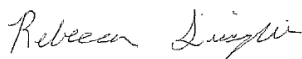
The anticipated maximum contribution from each sector of the T-Mobile facility is 56.2000% of the allowable FCC established general public limit (11.2400% of the FCC occupational limit). This was determined through calculations along a radial from each sector taking full power values into account as well as actual vertical plane antenna gain values per the manufacturers supplied specifications for gain.

The anticipated maximum composite MPE value for this site is 56.2000% of the allowable FCC established general public limit (11.2400% of the FCC occupational limit). This is based upon worst case modeling performed on the rooftop taking emissions contributions from all carriers present into account. This value will determine whether the site itself is in compliance with regards to electromagnetic emissions or whether mitigation solutions may be required to bring the site into compliance.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were within the allowable 100% threshold standard per the federal government.

EBI's modeling indicates that there are no areas on the walking/working surfaces at the rooftop or ground level in front of the T-Mobile antennas that may exceed the FCC standards for general population and/or occupational exposure.

In order to alert any workers potentially accessing the site, a blue Notice sign and a yellow Guidelines sign are recommended for installation at the access to the rooftop as depicted on the Signage Plan – Appendix B.



**REBECCA SINISGALLI**  
RF-EME TECHNICIAN I

**EBI Consulting**  
21 B Street  
Burlington, MA 01803





**Figure 1: Walking/Working Surface Emissions Thresholds**

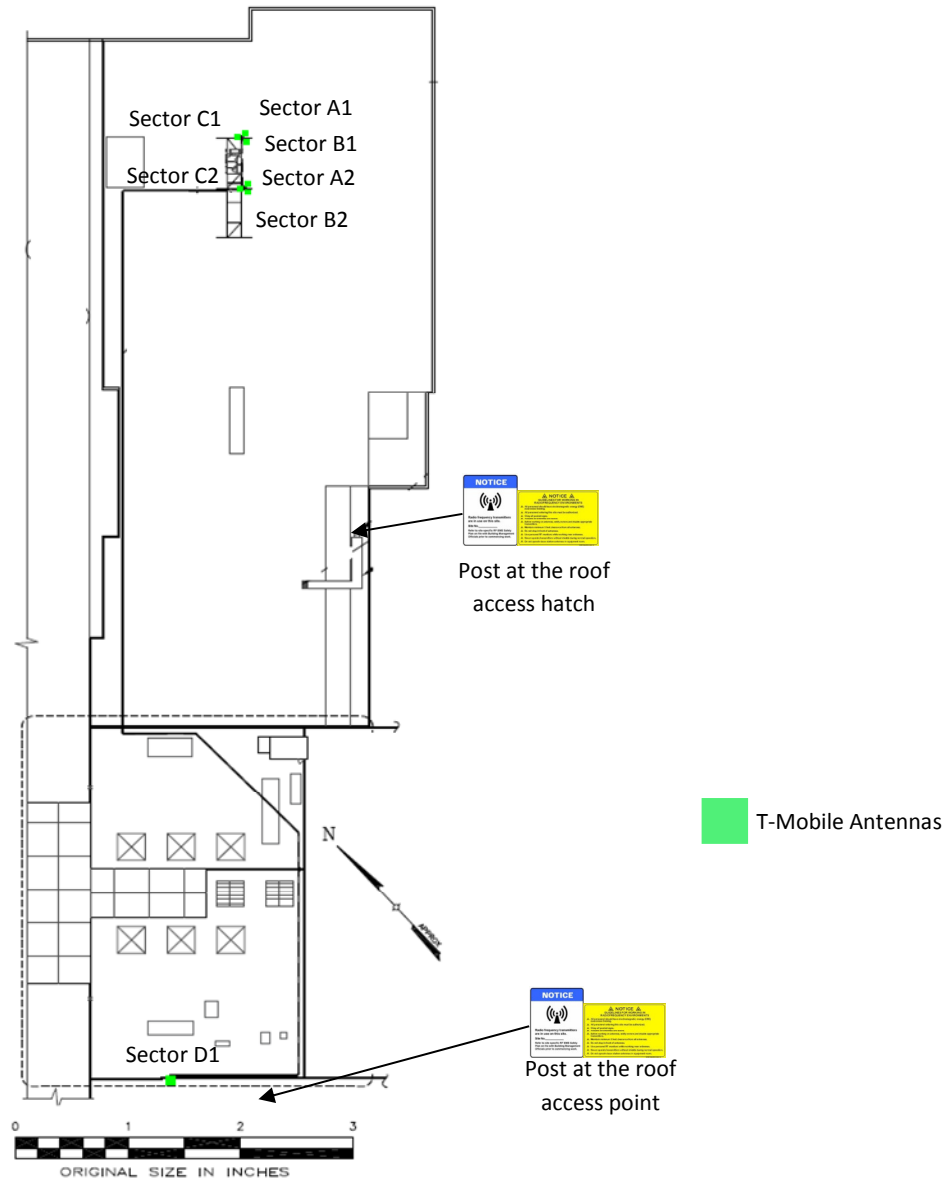
**PLAN VIEW**



Sector 1	There are no areas that exceed either the FCC's general public or occupational thresholds exposure limits in front of the sector 1 antennas on the walking/working surface.
Sector 2	There are no areas that exceed either the FCC's general public or occupational thresholds exposure limits in front of the sector 2 antennas on the walking/working surface.
Sector 3	There are no areas that exceed either the FCC's general public or occupational thresholds exposure limits in front of the sector 3 antennas on the walking/working surface.
Sector 4	There are no areas that exceed either the FCC's general public or occupational thresholds exposure limits in front of the sector 4 antennas on the walking/working surface.
Other Carriers	There are no other carrier antennas included in the modeling.



## Attachment I: Plan View – Signage Locations

<b>Status:</b>	<b>Compliant</b>
<b>Recommended Signage for compliance</b>	
<b>Sign Count</b>	<b>Sign Type</b>
<b>2</b>	
<b>2</b>	
<b>Notes:</b> <b>The Proposed site will be compliant with the installation of the mitigation measures.</b>	



Sign	Description	Posting Instructions
	<p><b>Blue Notice Sign</b></p> <p>Used to notify individuals they are entering an area where the power density emitted from transmitting antennas may exceed the FCC's MPE limit for the general public.</p>	<p>Securely post at the roof access hatch and roof access point to Sector D antennas in a manner conspicuous to all individuals entering thereon.</p> <p><b>Denote Site ID Number on Sign in Permanent Marker.</b></p>
	<p><b>Guidelines</b></p> <p>Informational sign used to notify workers that there are active antennas installed and provide guidelines for working in RF environments.</p>	<p>Securely post adjacent to the Blue Notice sign at the roof access hatch and roof access point to Sector D antennas in a manner conspicuous to all individuals entering thereon.</p>